AN INTENSIVE MATHEMATICS PROGRAM FOR FRESHMEN

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Introduction

Several studies have documented the inadequate preparation of high school graduates for college work. In Mathematics, the high rate of failure in College Algebra has been a perennial problem for most colleges and universities in the Philippines. Programs aimed at improving the situation have been undertaken at the high school level in various ways. Massive training of teachers, implementing innovative mathematics curricula, and adopting varied teaching strategies and instructional materials, among others, have been undertaken but instructors still find their students wanting in their preparation for College Algebra.

Recognizing the need to bridge the gap between a freshman's readiness for college mathematics and his high school preparation, De La Salle University-Dasmariñas implemented a program known as the Intensive Mathematics Program. Students enrolled in College Algebra for three-unit credit were required to attend classes for five hours a week. The results of two strategies/procedures employed in utilizing the extra hours shall be presented in this paper.

Students in three colleges, namely Arts and Sciences, Business Administration, and Radiologic Technology were placed under the intensive program as most of the four-year programs of these colleges offer mathematics courses beyond what is required by the general education curriculum.

The objective of this paper is to present the Intensive Mathematics Program as a vehicle in reducing the rate of failures in College Algebra.

Description of the Intensive Mathematics Program

Two procedures were used in the two school years that the Intensive Mathematics Program (IMP) was implemented. Since College Algebra is usually

offered as the first course in college mathematics, the implementation of the program was done only during the first semesters. The Mathematics Department requires its faculty members to use the same syllabus and give departmentalized periodical examinations. This holds true even before the implementation of the Intensive Mathematics Program.

During its first year of implementation (SY 1997-1998), students who were required to undergo the IMP attend the three-hour per week lecture with a Mathematics faculty. Another Mathematics faculty handles the remaining two hours, which were spent, for drills and exercises based on the topics discussed during the lecture. The extra hours were scheduled on Saturdays and a quiz was given at the end of each session for assessment. Ten percent of the periodical grade of the students came from the extra two-hour session.

During the first semester of school year 1998-1999, a new strategy was utilized to implement the IMP. Students attended a five-hour per week session in College Algebra handled by a mathematics faculty. The extra two hours were integrated in the three-hour lecture but were still spent for drills and exercises. Quizzes given during drills and exercises were treated as regular quizzes. The reason for this change in strategy was for the students to immediately make use of the additional time for drills and exercises right after a topic was discussed. This was an offshoot of the recommendations made in the evaluation of the first implementation of the IMP.

Statistical Results and Analysis

The study covers three school years (SY 1996-1997), the year before the implementation of the IMP; (SY 1997-1998), the year that the first strategy of the IMP was implemented; and (SY 1998-1999), the year of the second strategy of the IMP was implemented. To be able to establish the claim that the three batches of students received more or less the same high school mathematics training, purposive sampling was utilized. From the student population of the three colleges mentioned, a sample of 797 freshmen enrolled in Intensive Mathematics Program was taken by selecting those students who came from the top ten feeder high schools. Data were taken from the Admission and Testing Office for this purpose. Of these ten feeder high schools, only one is a public school. Of the remaining nine private schools, two are from Metro Manila. Over the years, it has been recorded by the Admission and Testing Office that seventy percent (70%) of the incoming freshmen of the University are consistently from these ten feeder high schools. The freshmen distribution by feeder high school is shown on Figure 1. It can be observed that in the three school years, the percentage of students coming from the feeder high schools is more or less equivalent. Thus, it can be said that the University admits more or less students who are of the same background and training.

The data also included the mathematics scores of the freshmen in the University Admission Test. The mathematics scores were obtained to of the

three batches of freshmen compare the mathematical ability in College Algebra. The mean score of the freshmen for SY 1996-1997 is 80.6; for SY 1997-1998, it is 80.41; and for SY 1998-1999, it is 80.35 (Table 1). The t-tests indicated that there is no significant difference between the mean scores of freshmen for SY 1996-1997 and SY 1997-1998. Likewise, there is no significant difference in the mean scores of freshmen for SY 1996-1997 and SY 1998-1999 as well as the mean scores of freshmen for SY 1997-1998 and SY 1998-1999 (Table 2). This is an indication that for the past three years and using the same University Admission Test, the three groups of freshmen have more or less the same performance in the Mathematics part of the University Admission Test.

Table 1 : Descriptive Statistics of the Mathematics Scores

School Year	1996-1997	1997-1998	1998-1999
Mean	80.69	80.41	80.35
Variance	15.31	14.46	15.86

Table 2: T-Test on the Means of the Mathematics Score

School Year	1996-1997/ 1997-1998	1996-1997/ 1998-1999	1997-1998/ 1998-1999
t-value	-0.76327	-0.93426	-0.21714
p-value	0.222284	0.17532	0.414408

Critical value of z at $\alpha = 0.05 = 1.96$

The final grades in College Algebra was considered as the bases for showing the effectiveness of the Intensive Mathematics Program. Two statistics were used for this purpose. To be able to measure the attrition rate in College Algebra, the z-test for comparison using proportion was utilized. Results show that there is a significant difference in the number of failures between SY 1996-1997 and SY 1997-1998 (Table 3). This indicates that the rate of failure was lessened after the implementation of the IMP. Correspondingly, there is significant difference in the number of failures between SY 1996-1997 and SY 1998-1999 (Table 4). However, it can be noted in Table 5 that there is a significant difference in the number of failures between SY 1997-1998 and SY 1998-1999. This indicates that the change in strategy did not improve the attrition rate in College Algebra.

Table 4 : Comparison of Proportions between SY 1996-1997 and SY 1998-1999

School Year	1996-1997	1997-1998	1998-1999
Number of Failures	70	91	161
Number of Freshmen	186	369	555
Proportion (failed)	0.3763	0.2466	0.2901
z-value	3.179		

Critical value of z at $\alpha = 0.05 = 1.96$

Table 5 : Comparison of Proportions between SY 1997-1998 and SY 1998-1999

School Year	1997-1998	1998-1999	Total
Number of Failures	3	91	94
Number of Freshmen	242	369	611
Proportion (failed)	0.0123	0.2466	0.1538
z-value	3.179		

Critical value of z at $\alpha = 0.05 = 1.96$

The result above is further strengthened by comparing the average final grade for each school year. Results show that there is a significant difference between the means of the final grades for SY 1996-1997 and SY 1997-1998. Also, there is a significant difference between the means of the final grades in College Algebra for SY 1996-1997 and SY 1998-1999. It is also observed that the strategy used in SY 1997-1998 is better than the strategy used in SY 1998-1999.

Table 6 : Descriptive Statistics of Final Grades of Freshmen

School year	1996-1997	1997-1998	1998-1999
Mean	1	1.834	1.653
Variance	0.7338	0.4501	0.6920

Table 7 : T-Test on the Mean of the Final Grades of Freshmen

School Year	1996-1997/ 1997-1998	1996-1997/ 1998-1999	1997-1998/ 1998-1999
t-value	11.8139	2.2214	-0.21714
t critical	1.6481	1.6475	1.6472

α = .05 level of significance

Conclusion

If given the opportunity, students will improve their performance in Mathematics. As shown in this paper, the Intensive Mathematics Program has lessened the rate of failures in College Algebra. It is therefore safe to say that it is the effect of the IMP that improved the attrition rate for this group of students. Giving more time for students to practice for solving problems has, time and again, proven as an effective formula. However, there may be other factors attributed to on the result that the strategy used in SY 1998-1999 is less effective than the strategy used in SY 1997-1998. Another study to confirm this result is therefore highly recommended.

It would be naïve to assume that the IMP will work for every freshmen but administrators and teachers may try to adopt the IMP in their respective schools to be able to help students.